Pearson Edexcel

Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE
Mathematics A (4MA1)
Paper 2F

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.
  Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)

- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent
  - indep – independent
  - awrt – answer which rounds to
  - eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.
  If there is no answer on the answer line then check the working for an obvious answer.

- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths					
Apart from question 6d, 9b, 15, 18, 21c (where the mark scheme states otherwise) the correct answer, unless clearly obtained from an incorrect method, should be taken to imply a correct method.					
Q		**Working**	**Answer**	**Mark**	**Notes**
1	a		26 or 64	1	B1 or both 26 and 64 with no others
	b		21 or 39	1	B1 or both 21 and 39 with no others
	c		17 or 31	1	B1 or both 17 and 31 with no others
	d		1 or 64	1	B1 or both 1 and 64 with no others
					Total 4 marks

2	a		3000	1	B1
	b		6.5	1	B1
					Total 2 marks

3	a			2	M1 for at least 2 correct tallies or frequencies
			2, 5, 4, 3, 2		A1 mark frequencies only – in either column
	b		1	1	B1 allow ft from (a)
	c		4	1	B1
					Total 4 marks

4	a		New York	1	B1 accept −15
	b		25	1	B1 accept −25
	c		−28	1	B1
					Total 3 marks

5	a		0.003, 0.035, 0.5, 0.539, 0.9	1	B1	
	b		60	1	B1	allow 60%
	c		$8\frac{4}{7}$	1	B1	oe
	d	$0.95 - 0.68$ **or** $\frac{95}{100} - \frac{68}{100}$ **or** $\frac{19}{20} - 0.68$ oe		2	M1	or $\frac{27}{100}$ or 27%
			0.27		A1	
						Total 5 marks

6	a		23	1	B1	
	b		Added 4	1	B1	accept +4, 4 more, oe, $4n - 1$ (need to know 4 and we need to add/go up oe)
	c	(23) 27, 31, 35, 39, 43, 47, 51, 55, 59, 63, 67, 71 **OR** $4n - 1 = 70$		2	M1	allow list of numbers going up in 4's up to 71 or more (allow one error)
			71		A1	
	d	No and identifying all terms in sequence are odd **OR** No and method to count on as far as 95 (or clearly showing 95) **OR** No and method to find n when term is 96 e.g. solving $4n - 1 = 96$	No with reason	1	B1	must have 'No' oe or 'is not' oe and a reason.
						Total 5 marks

7	a		(3, −1)	1	B1	
	b		(×) at (−2, −4)	1	B1	condone missing label as long on unambiguous
	c		(−1, 2)	2	B2	B1 for (−1, *a*) where $a \neq 2$ **or** (*b*, 2) where $b \neq -1$
	d		$x = 4$ drawn	1	B1	
						Total 5 marks

8		13 50	3	B3	For the correct time of 13 50 or 1.50 pm or 1.50 in the afternoon oe (B2 for 1.50 or 1.50 am or stating 2 hours 40 mins or 160 mins or intention to add all 4 times onto 11.10 B1 for intention to add all 4 times together or evidence of intention to add on 2 or 3 times to 11 10)
					Total 3 marks

9	a i		33	1	B1	accept 32 – 34
	ii		15	1	B1	accept 15 – 16
	b	e.g. 820 ÷ 10 × "33" (= 2706) **or** 2850 ÷ 50 × "15" (= 855)		2	M1	method to convert 820 metres to feet **or** 2850 feet to metres, allow ft from (ai) or (aii) **or** a value for 820 m to feet in range (2620 – 2740) **or** a value for 2850 feet to m in range (830 – 900)
			2850 feet supported by working		A1	2850 selected (could be unambiguously circled, underlined or stated) with correct working and figures as above to justify result, ft from part (ai) or (aii)
						Total 4 marks

10	e.g. 360 – (30 + 45 + 165) (= 120)		4	M1	method to calculate One Stop Shoes angle
	e.g. $\frac{30}{45}$, 18 (= 12) or $\frac{30}{120}$, 48 (= 12) oe			M1	method to calculate ABC Shoes frequency
	e.g. 165 ÷ 45 × 18 (= 66) oe **or** 165 ÷ 30 × "12" (= 66) oe **or** 165 ÷ "120" × 48 (= 66) oe **or** 18 + 48 having shown or implied that 120 + 45 = 165 and a clear intention that this is the method for Superfast Trainers (= 66)			M1	method to calculate Superfast Trainers frequency
		12, 120, 66		A1	fully correct table
					Total 4 marks

11	0.23 × 450 oe		2	M1 or for an answer of 553.5 or 346.5
		103.5		A1
				Total 2 marks

12	a		1, 3, 9	1	B1 need all three but ignore any repeats
	b	15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195, 210 **and** 70, 140, 210 **OR** 3 × 5 **and** 2 × 5 × 7 **OR** 2 × 3 × 5 × 7 (2, 3, 5, 7) oe eg 3 × 5 × 14 (3, 5, 14) 3 | 15 | 70 5 | 5 | 70 7 | 1 | 14 2 | 1 | 2 1 | 1 5 | 15 | 70 3 | 3 | 14 14 | 1 | 14 1 | 1		2	M1 for listing at least three multiples of 15 and 70 **or** finding the prime factors of 15 and 70 (could be factors at the ends of branches of factor trees or lists 3, 5 and 2, 5, 7) or a correct calculation or the correct values for the LCM eg 2,3,5,7 or 3,5,14 oe (could be in a table)
			210		A1
					Total 3 marks

13	eg $\frac{1}{2}\times(20+26)\times12\,(=276)$ **or** $12\times20+\frac{1}{2}\times(26-20)\times12\,(=276)$ **or** $12\times26-\frac{1}{2}\times(26-20)\times12\,(=276)$		5	M2	complete method to find the area of the shape M1 for method to find the area of a rectangle $12\times20\,(=240)$ **or** $12\times26\,(=312)$ **or** the area of the triangle $\frac{1}{2}\times(26-20)\times12\,(=36)$
	"276" ÷ 20 (= 13.8)			M1	(indep) method to find the number of tins for their area ft any value from a calculation that includes at least two of 20, 26 & 12
	eg 3 × \$40 + 2 × \$13 (= \$146) or 14 × \$13 (= \$182) or 4 × \$40 (= \$160)			M1	method to calculate a cost for their number of tins dep on previous M1 (NB: use n × \$40 where n is the next multiple of 4 greater than the number of tins needed, divided by 4)
		146		A1	cao dep on accurate figures
					Total 5 marks

14	a		$5(5f - 2)$	1	B1	
	b	$c + h = 5y$ or $\frac{c}{5} = y - \frac{h}{5}$ or $\frac{c+h}{5}$		2	M1	
			$y = \frac{c+h}{5}$		A1	oe if the student puts $\frac{c+h}{5}$ on the answer line then if we have previously see $y = \frac{c+h}{5}$ we can award full marks
	c	$4x > 2 - 7$ oe or $x + \frac{7}{4} > \frac{2}{4}$ oe		2	M1	accept as an equation or with wrong inequality sign.
			$x > -1.25$		A1	oe allow $(-1.25, (+)\infty)$ Note: award M1A0 for an answer of -1.25 with no sign or the incorrect sign eg $x = -1.25$, $x < -1.25$
						Total 5 marks

15	$\frac{2}{5}\times\frac{20}{11}$ or eg $\frac{8}{20}\div\frac{11}{20}$		2	M1	For inverting $\frac{11}{20}$ and a clear intention to multiply or for writing both fractions correctly over the same common denominator
	$\frac{2}{5}\times\frac{20}{11}=\frac{40}{55}=\frac{8}{11}$ or $\frac{2}{\cancel{5}^{1}}\times\frac{\cancel{20}^{4}}{11}=\frac{8}{11}$ or $\frac{8}{20}\div\frac{11}{20}=\frac{8}{11}$	Clearly shown		A1	dep on M1 continued to clearly show given result
					Total 2 marks

16	a		$50 < L \leq 60$	1	B1	oe eg 50 - 60
	b	$25 \times 6 + 35 \times 26 + 45 \times 31 + 55 \times 40 + 65 \times 17$ $(150 + 910 + 1395 + 2200 + 1105)(= 5760)$			M2	For correct products using midpoints (allow one error) with intention to add. M1 for products using frequency and a consistent value within the range (allow one error) with intention to add or correct products using midpoints (allow one error) without addition
		"5760" ÷ "120"			M1	dep on M1
			48	4	A1	
						Total 5 marks

17 a	150 ÷ 6 × 14 oe		2	M1	
		350		A1	
b	630 ÷ 90 × 6 oe		2	M1	
		42		A1	
c	162 ÷ (2 + 7) × 2 oe		2	M1	
		36		A1	
				Total 6 marks	

18	*ADC* = 180 – 58 (= 122) **or** *EDF* = 122 **or** *CDE* = 58 **or** *ADF* = 58		5	M1	may be seen marked on the diagram
	e.g. *DEF* = 58 ÷ 2 **or** *DEF* = (180 – 122) ÷ 2			M1	complete method to find angle *DEF*
		29		A1	
				B2	dep on M2 for fully correct reasons for their method (B1 dep on M1 for one correct reason stated and used) e.g. Allied angles, co-interior angles, Alternate angles, Corresponding angles, Vertically opposite angles are equal (or Vertically opposite angles are equal), Angles on a straight line add up to 180°(or angles on a straight line add to 180°), Sum of two angles in a triangle are equal to opposite exterior angle, Angles in a triangle add up to 180°(or Angles in a triangle add up to 180°), Base angles in an isosceles triangle Angles in a quadrilateral add up to 360. (accept "4-sided shape"or parallelogram) Opposite angles of a parallelogram are equal
				Total 5 marks	

19	$76 \div (5 + 2 - 3)$ (= 19) $5x + 2x - 3x = 76$, $x = 76 \div 4$ (=19) oe		4	M1
	3 × "19" (= 57)			M1
	"57" – 48.5(0)			M1
		8.5(0)		A1
				Total 4 marks

20	a	1.04 × 3 130 000 oe			3	M2	complete method to increase salary by 4% M1 for 0.04 × 3 130 000 oe (= 125 200)	
				3 255 200		A1		
	b	for 0.15 × 750 000 oe (=112 500) **or** 0.85 × 750 000 oe (637 500)	**OR**		3	M1	For method to find depreciation for 1 year or value after 1 year	**OR** M2 for 750 000 × 0.85^3(= 460 593.75) **or** 750 000 × 0.85^4 **(=** 391 504.69) (M1 for 750 000 × 0.85^2 **(=** 541 875)
		0.85 × "637 500" (= 541 875) oe 0.85 × "541 875" (= 460 593.75) oe	750 000 × 0.85^3			M1	for completing method	
				460 594		A1	accept 460 593 – 460 594	
							SC: if no other marks gained award M1 for 0.55 × 750 000 oe **(=** 412 500) **or** 0.45 × 750 000 oe **(=** 337 500) accept (1 – 0.15) as equivalent to 0.85 throughout	
								Total 6 marks

21	a			g^{10}	1	B1
	b			$9c^2d^8$	2	B2 B1 for 2 out of 3 terms correct as part of a product
	c	eg $4x + 3y = 17$ $-\ 4x + 8y = 20$ **or** eg $4(5 - 2y) + 3y = 17$	eg $8x + 6y = 34$ $-\ 3x + 6y = 15$ **or** eg $4x + 3 \times ½(5 - x) = 17$		3	M1 Correct method to eliminate x or y: coefficients of x or y the same **and** correct operation to eliminate selected variable (condone any one arithmetic error in multiplication) **or** writing x or y in terms of the other variable and correctly substituting
		eg $4x + 3 \times 0.6 = 17$ **or** $x + 2 \times 0.6 = 5$	eg $4 \times 3.8 + 3y = 17$ **or** $3.8 + 2y = 5$			M1 (dep) correct method to find second variable – could start process again or use substitution
				$x = 3.8$ $y = 0.6$		A1 oe for both solutions dep on first M1
						Total 6 marks

22	$\tan x = \frac{3.4}{4.7}$ oe eg $\cos x = \frac{4.7}{\sqrt{3.4^2 + 4.7^2}}$			M1	or $\sin x = \frac{3.4 \sin 90}{\sqrt{3.4^2 + 4.7^2}}$ oe
	$(x =) \tan^{-1}\left(\frac{3.4}{4.7}\right)$ oe eg $(x =) \cos^{-1}\left(\frac{4.7}{\sqrt{3.4^2 + 4.7^2}}\right)$			M1	or $(x =) \sin^{-1}\left(\frac{3.4 \sin 90}{\sqrt{3.4^2 + 4.7^2}}\right)$ oe
		35.9	3	A1	accept 35.7 - 36.1
					Total 3 marks

23	$8.5^2 - (8 \div 2)^2$ (= 56.25) **or** $\cos x = \frac{4}{8.5}$		4	M1	**or** eg $\cos A = \frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}$
	$\sqrt{"56.25"}$ (= 7.5) **or** $x = \cos^{-1}\left(\frac{4}{8.5}\right)$ (= 61.927...)			M1	**or** eg $(A =) \cos^{-1}\left(\frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}\right)$ (61.927...) (other angle = 56.144...)
	8 × "7.5" ÷ 2 oe **or** 0.5 × 8 × 8.5 × sin "61.927..."			M1	**or** eg 0.5 × 8.5 × 8 × sin61.927...oe
		30		A1	
					Total 4 marks

24	$\pi \times 3^2 \times h = 72\pi$ oe		5	M1	Allow use of 3.14... or $\frac{22}{7}$ for π and use of 226... for 72π
	$h = 72\pi \div (\pi \times 3^2)$ oe **or** $h = 8$			M1	method to isolate h (may be seen in several stages)
	$2 \times \pi \times 3^2$ (= 18π or 56.54...) **or** $2 \times \pi \times 3 \times$ "8" oe (= 48π or 150 - 151)			M1	method to find the area of the two circles **or** curved surface area – use of their h, dep on M1 (NB may get this mark for area of 2 circles with no previous marks awarded)
	$2 \times \pi \times 3^2 + 2 \times \pi \times 3 \times$ "8" oe (= 66π)			M1	complete method to find the total surface area ft their h dep on 1st M1, including intention to add, to find the total surface area
		207		A1	accept 207-208
					Total 5 marks

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